<Note> Hidden Risk of Arboreality?: An Arboreal Death of an Infant Chimpanzee at Mahale

AUTHOR(S):

Nakamura, Michio; Ramadhani, Abdala

CITATION:

Nakamura, Michio ...[et al]. <Note> Hidden Risk of Arboreality?: An Arboreal Death of an Infant Chimpanzee at Mahale. Pan Africa News 2014, 21(2): 17-19

ISSUE DATE:

2014-12

URL:

http://hdl.handle.net/2433/192913

sion has been well documented as coalitionary behavior may be an evolved tactic by which chimpanzees increase their fitness through increased access to territory, food and mates (Watts & Mitani 2001; Wilson & Wrangham 2003; Watts *et al*. 2006; Wrangham *et al*. 2006). That the pattern holds for intracommunity aggression suggests that ecology and territory size is a key predictor of violent behavior in general. Chimpanzees avoid costly encounters when possible, and a greater home-range size permits less frequent contact, and therefore less need for violent behavior. These data are preliminary, and future research should calculate rates of aggression within communities to robustly test trends suggested by this research.

ACKNOWLEDGMENTS

We thank the Government of Uganda, particularly the Uganda National Council for Science and Technology and the Uganda Wildlife Authority. We thank Aggrey Rwetsiba, TSWR Warden Chris Oryema, Chief Warden Charles Tumwesigye and staff at the Semliki Wildlife Reserve for essential support. We gratefully acknowledge the National Science Foundation (SGER BNS 97-11124 and BCS 98-15991), the Semliki Chimpanzee Project, and Indiana University (Faculty Research Support Program and the College of Arts and Sciences) for financial support. We thank Holly Green for assistance in data collection. Finally, we thank Stephanie Dickinson and the Indiana Statistical Consulting Center (ISCC) provided statistical support. Finally, we thank Kazuhiko Hosaka and Michio Nakamura for thoughtful commentary on the original manuscript.

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<NOTE>

Hidden Risk of Arboreality?: An Arboreal Death of an Infant Chimpanzee at Mahale

Michio Nakamura[1] & Abdala Ramadhani[2]

1 *Wildlife Research Center, Kyoto University, Japan*
2 *Mahale Mountains Chimpanzee Research Project*
(E-mail: nakamura@wrc.kyoto-u.ac.jp)

INTRODUCTION

We humans are terrestrial animals, basically staying on the ground for most of our daily activities. On the other hand, chimpanzees' activities take place both on the ground and in trees (*e.g.* Takemoto 2004). They typically use the ground when traveling long distances but often feed arboreally because their main foods (*i.e.* fruits and leaves) are produced by trees.

Being on the ground is generally more dangerous than being in trees: for example, mid- to large-sized carnivores that can potentially prey upon infant chimpanzees are often terrestrial (although some can climb trees, they usually walk at ground level). Thus, some authors have proposed that chimpanzees' arboreal beds may have an antipredatory function (Pruetz *et al*. 2008; Stewart & Pruetz 2013). In addition, a chimpanzee may get involved in aggressive intimidation displays by conspecific males that usually take place on the ground. Thus, when females and immature chimpanzees see a displaying male approaching, they usually climb up trees to avoid the risk. Such potential dangers of being attacked by predators or conspecifics may be more fatal to smaller-bodied infant chimpanzees than adults.

In light of these events, a mother chimpanzee with a small infant looks more protective on the ground than in trees. For example, on the ground, a one-year-old infant is almost always carried by the mother when she travels, and is usually within arm's reach when the mother is engaged in grooming or resting. Should anything untoward occur, the mother will immediately retrieve the infant. On the other hand, in a tree, an infant of the same age may meander farther away. In this instance, the mother appears less worried, probably because she can better monitor any potential danger.

Here we report a rare observation of an infant's death,

Figure 1. A dorsal view of the dead body of the female infant chimpanzee. An arrow shows where the intestine is protruded out of the anus.

which may have resulted from independent arboreal activity.

OBSERVATION

A dead body of a female infant chimpanzee, assumed to be TE13 (a yet unnamed one-year-old infant daughter of Ternie [TE]), born between March 12 and May 12, 2013, was found within Mahale M group's home range (Mahale Mountains National Park, Tanzania) on July 13, 2014. When TE13 was last observed alive in the company of her mother on June 7, 2014, the infant looked healthy with no indication of sickness or injury. Four days later, on June 11, Ternie was observed without TE13, and there was no confirmed sighting of another individual (*i.e.* an allomother) carrying the infant. Because an infant of that age never travels away from the mother for any length of time, TE13's safety became an immediate concern. A research assistant raised the possibility that TE13 may have succumbed to infanticide because she was healthy when last seen.

On June 13, the second author, AR, found a dead infant on a *Psydrax parviflora* tree, north of the Katulu Valley where M group chimpanzees frequently visited. The dead body was pinched and stuck between two boughs that were branched just underneath. It was so tightly pinched between the boughs that AR needed to exercise some force to detach the body from the tree. No bite wounds were found on the remains, and all limbs and fingers were intact (Figure 1). Thus, the possibility of infanticide or predation was ruled out. Because the remains were lodged in a tree, there was no sign of scavenging (a dead body on the ground is easily ravaged by bush-pigs [*Potamochoerus larvatus*] or other scavengers). The body's surface was completely desiccated, but there was a strong, putrid smell suggesting that the internal organs were decomposing. From the external genital organs, the sex was judged as female. From the teeth and body size, the remains were not of a stillborn infant. Considering the disappearance of TE13 between June 8 and June 11 (two to five days before the dead body was found) and the confirmed presence of all the other infants around that age, it appeared likely that the remains were those of TE13.

It is significant to note that a part of the intestine was found outside the anus (see Figure 1). Because the body was tightly pinched between two tree boughs, we assume that the infant was accidentally caught between them, which caused a visceral cleft.

DISCUSSION

Judging from the circumstantial evidence, we envisioned the occurrence as follows: TE13's mother (or another chimpanzee) may have pushed against one of the two boughs while feeding on the tree's fruits. The bough may then have bounced sharply back as she changed her position. Tragically, at that moment, her infant may possibly have been trapped between the boughs.

Ternie had already successfully weaned her first child (TE13's older sister), and there was no indication that her childrearing skills had somehow degraded. Therefore, we did not believe TE13's death was due to any inappropriate child-handling by the mother. All the evidence showed it was rather an unfortunate accident.

This observation may imply that even an arboreal environment, which is thought to be safer than a terrestrial one, can sometimes be dangerous. If mothers protected their infants by always holding them, even in trees, as they do on the ground, such an accident could be prevented. However, carrying a one-year-old infant may impede the arboreal activity of mothers, and may not be ideal for infants' locomotor development. Thus, there should be some trade-offs.

Arboreal accidents do cause the deaths of healthy chimpanzees. It was reported that two Gombe chimpanzees (Williams *et al*. 2008) and one Taï infant chimpanzee (Boesch & Boesch-Achermann 2000) died after falling from trees. Although there have been no direct observations of falls from trees causing any chimpanzee deaths at Mahale (Nishida *et al*. 2003), Nakai *et al*. (2004) inferred from the skeletal trauma of an adult female named Gwakakumo that she may have died from such a fall. At a Japanese zoo, a two-year old male chimpanzee died by accidentally hanging himself from a rope (Yoshida 1994). Our report definitively adds another cause of deaths in relation to arboreality.

Such accidents constitute a relatively rare cause of *confirmed* deaths of wild chimpanzees (Boesch & Boesch-Achermann 2000; Nishida *et al*. 2003; Williams *et al*. 2008). However, this does not necessarily mean that they are *really* that rare; it is possible that such incidents are simply not noted. In TE13's case, we were lucky enough to find her remains because of two incidental conditions. First, during the period in question, M group chimpanzees repeatedly visited the same area with stands of *Psydrax*,

meaning that human observers were also there on a regular basis. Second, because *Psydrax* trees are relatively short with sparse canopies, it was easy for the observer to notice the dead body. We may not have been able to notice the remains if a higher and denser-canopied tree were involved or in a place less frequented by the chimpanzees. In such cases, we cannot solve the disappearances of infants. This dilemma poses the distinct possibility that arboreal deaths may be more common than we know.

ACKNOWLEDGEMENTS

We would like to thank COSTECH, TAWIRI, and TANAPA for their permission to conduct long-term research at Mahale.

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<NOTE>
Responses of Wild Chimpanzees to Fresh Carcasses of Aardvark (*Orycteropus afer*) in Mahale

Kazuhiko Hosaka[1], Eiji Inoue[2] & Mariko Fujimoto[3]

1 *Kamakura Women's University, Japan*
2 *Department of Zoology, Graduate School of Science, Kyoto University, Japan*
3 *Graduate School of Asian and African Area Studies, Kyoto University, Japan*
(E-mail: hosaka@kamakura-u.ac.jp)

INTRODUCTION

Despite more than 50 years of research on wild chimpanzees, there has been no record of encounters between them and aardvarks (*Orycteropus afer*). The habitats of aardvarks are distributed widely in sub-Saharan Africa and cover most of the narrower habitats of chimpanzees (Lindsey *et al*. 2008). However, aardvarks are typically nocturnal, foraging for termites, ants, and larvae at night, while chimpanzees are typically diurnal, hence the lack of recorded encounters between the two species.

This study reports the first two recorded observations of the rare event of chimpanzees encountering aardvark carcasses, which occurred within 1 month. This provides valuable insight on two topics.

The first topic is the reaction of chimpanzees to non-conspecific carcasses. The observations provide a variety of clues about chimpanzees' emotional traits and their cognition of potential dangers such as predation and illness. Several studies (Teleki 1973; Boesch 1991; Hosaka *et al*. 2000) reported that chimpanzees showed intense emotions of fear and confusion toward dead bodies of mature members belonging to the same unit-group. Early, harsh "wraa" calls and late, feeble "huu" calls (Goodall 1986) seem to be typically expressed during such encounters. The same calls are emitted when chimpanzees see or hear large carnivores such as leopards (*Panthera pardus*) and lions (*Panthera leo*) (Hiraiwa-Hasegawa *et al*. 1986; Tsukahara 1993).

The second topic is the scavenging tendency of chimpanzees. Watts (2008) reviewed published cases of scavenging by wild chimpanzees and argued that chimpanzees avoid scavenging because fresh carcasses are rare in the forest and chimpanzees may not recognize certain species as potential prey, whereas Mahale chimpanzees sporadically scavenged fresh carcasses of their prey species, such as bushbuck (*Tragelaphus scriptus*), killed and cached by leopards (Hasegawa *et al*. 1983; Hosaka *et al*. 2001). In contrast, several reports (*e.g.* Boesch & Boesch 1989; Hirata *et al*. 2001) suggest that the western chimpanzees do not eat mammals absent from their prey species list at the respective study sites; they did not consume a blue duiker (*Cephalophus monticola*) or a western tree hyrax (*Dendrohyrax dorsalis*) accidentally captured and killed, but only toyed with them.

METHODS

Observations of wild chimpanzees (M-group) were